

DUGWAY PERMIT

MODULE VII

ATTACHMENT 8

**HWMU 38
POST-CLOSURE PLAN**

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1.0 INTRODUCTION

There are three objectives of this post closure plan; 1) Ensure Dugway Proving Ground (Dugway or DPG) complies with the post closure permit issued by the State of Utah in accordance with Title 40 Code of Federal Regulations (CFR) §264.117, with respect to post closure requirements; 2) protection of potable groundwater in the confined aquifer by monitoring horizontal and vertical migration of contamination of groundwater; and 3) inspection and tracking and inspections to ensure industrial site use. In accordance with Title 40 Code of Federal Regulations (CFR) §270.28 and Utah Administrative Code (UAC) R315-3-2.19, the post-closure plan is required to include specific information for a closed facility. As applicable to Hazardous Waste Management Unit (HWMU) 38, the information requirements include:

- General description of the facility;
- Description of security procedures;
- General inspection schedule;
- Preparedness and Prevention Plan;
- Facility location information (including seismic and flood plain considerations);
- Closure Plan or Closure Proposal;
- Certificate of Closure;
- Topographic map, with specific scale;
- Summary of groundwater monitoring data; and
- Identification of uppermost aquifer and interconnected aquifers.

Table 1 provides the regulatory citations for the general information requirements and the specific locations in this Post-Closure Plan where the specific information is presented.

**Table 1: Summary of HWMU 38 Post-Closure Information Requirements
Under 40 CFR §270.14, UAC R315-3-2.19, and UAC R315-3.2.5**

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(1) UAC R315-3.2.5(b)(1)	General Description of the Facility	Section 2.0
40 CFR §270.14(b)(4) UAC R315-3.2.5(b)(4)	Description of Security Procedures	Section 3.0
40 CFR §270.14(b)(5) UAC R315-3.2.5(b)(5)	General Inspection Schedule	Section 7.0, Module VII Table VII-3, and Module VII Form A
40 CFR §270.14(b)(6) UAC R315-3.2.5(b)(6)	Preparedness and Prevention	Section 4.0
40 CFR §§270.14(b)(11)(i-ii, v) UAC R315-3.2.5(b)(11) (i-ii, v)	Facility Location Information Applicable seismic standard	Section 5.0
40 CFR §§270.14(b)(11) (iii-v) UAC R315-3.2.5(b)(11) (iii-v)	Facility Location Information 100-year floodplain	Section 6.0
40 CFR §270.14(b)(13) UAC R315-3.2.5(b)(13)	Copy of the Closure Plan	Closure Report open for public comment ending on September 6, 2004 with no comments

**Table 1: Summary of HWMU 38 Post-Closure Information Requirements
Under 40 CFR 270.14, UAC R315-3.2.19, and UAC R315-3.2.5 (Continued)**

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(14) UAC R315-3.2.5(b)(14)	Closure Certification and Notification	Section 9.0 and Appendix A
40 CFR §270.14(b)(16) UAC R315-3.2.5(b)(16)	Post-Closure Cost Estimate	Federal Facilities are exempt from this requirement
40 CFR §270.14(b)(18) UAC R315-3.2.5(b)(18)	Proof of Financial Coverage	Federal Facilities are exempt from this requirement
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (i)	Topographic Map Map Scale and Date	Figure 2 (1 inch = 1000 feet)
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (ii)	Topographic Map 100-year floodplain area	Section 6.0; HWMU 38 is not located within a verified 100-year floodplain area
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (iii)	Topographic Map Surface waters including intermittent streams	Figure 2; No distinct natural drainage features are evident at HWMU 38
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (iv)	Topographic Map Surrounding land uses	There are no residential populations in the vicinity of HWMU 38. The closest residential area is English Village (approximately 10 miles away)
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (v)	Topographic Map A wind rose (i.e., prevailing windspeed and direction)	There are no residential populations in the vicinity of HWMU 38. The closest residential area is English Village (approximately 10 miles away). A wind rose is not deemed necessary for HWMU 38
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (vi)	Topographic Map Orientation of Map, North Arrow	Figure 2
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (vii)	Topographic Map Legal boundaries of the hazardous waste management facility.	Legal boundaries have not been established at DPG for former HWMUs
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (viii)	Topographic Map Access control, fence, gates	Figure 2; Section 3.0
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (ix)	Topographic Map Injection and withdrawal wells	Figure 2; There are no injection or withdrawal wells in the vicinity of HWMU 38
40 CFR §270.14(b)(19) UAC R315-3.2.5(b)(19) (xi)	Topographic Map Barriers for drainage or flood control	Figure 3; The HWMU 38 site is graded to drain away from the decontamination pad

**Table 1: Summary of HWMU 38 Post-Closure Information Requirements
Under 40 CFR 270.14, UAC R315-3.2.19, and UAC R315-3.2.5 (Continued)**

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(c) UAC R315-3.2.5(c)(1)	Groundwater Monitoring Information Summary of Groundwater Data	Post-closure groundwater monitoring is required at HWMU 38. Groundwater Management Plan/Ditto GMA (PES, 2004); HWMU 38 Closure Report - Appendix D
40 CFR §270.14(c) UAC R315-3.2.5(c)(2)	Groundwater Monitoring Information Identification of uppermost aquifer	Section 2.6; Post-closure groundwater monitoring is required at HWMU 38. Groundwater Management Plan/Ditto GMA (PES, 2004); HWMU 38 Closure Report - Section 3.3
40 CFR §270.14(c) UAC R315-3.2.5(c)(3)	Groundwater Monitoring Information Delineation of the Waste Management Area	Figure 2; Post-closure groundwater monitoring is required at HWMU 38. Groundwater Management Plan/Ditto GMA (PES, 2004); HWMU 38 Closure Report
40 CFR §270.14(c) UAC R315-3.2.5(c)(4)	Groundwater Monitoring Information Extent of Plume	Section 2.6; Post-closure groundwater monitoring is required at HWMU 38. Groundwater Management Plan/Ditto GMA (PES, 2004); HWMU 38 Closure Report - Section 3.5
40 CFR §270.14(c) UAC R315-3.2.5(c)(5)	Groundwater Monitoring Information Detailed Plans/Engineering Report for Proposed Groundwater Program	Section 8.0; Post-closure groundwater monitoring is required at HWMU 38. Groundwater Management Plan/Ditto GMA (PES, 2004)
40 CFR §270.14(c) UAC R315-3.2.5(c)(6)(i)	Groundwater Monitoring Information Proposed List of Parameters	Post-closure groundwater monitoring is required at HWMU 38. Groundwater Management Plan/Ditto GMA (PES, 2004)
40 CFR §270.14(c) UAC R315-3.2.5(c)(6)(ii)	Groundwater Monitoring Information Proposed Groundwater Monitoring System	Post-closure groundwater monitoring is required at HWMU 38, Groundwater Management Plan/Ditto GMA (PES, 2004)
40 CFR §270.14(c) UAC R315-3.2.5(c)(6)(iii)	Groundwater Monitoring Information Background Values	Post-closure groundwater monitoring is required at HWMU 38. Groundwater Management Plan/Ditto GMA (PES, 2004)
40 CFR §270.14(c) UAC R315-3.2.5(c)(6)(iv)	Groundwater Monitoring Information A description of the Proposed Sampling	Post-closure groundwater monitoring is required at HWMU 38. Groundwater Management Plan/Ditto GMA (PES, 2004)

2.0 FACILITY DESCRIPTION

The following provides a general description of HWMU 38, also known as the Ditto Decontamination Pad at Dugway Proving Ground (DPG or Dugway), as required by UAC R315-3.2.5(b)(1) (Figure 1).

2.1 HWMU 38 LOCATION AND HISTORY

HWMU 38, also known as the Ditto Decontamination Pad, is located on Fourth Avenue, south of Stark Road and south of Ditto (Figures 2 and 3). HWMU 38 has been operational since 1986, the year it was constructed, and is still in use. According to DPG personnel the pad has been mainly used to test the effectiveness of decontamination procedures on new generators using agent simulants (methyl salicylate or diethyl malonate).

The HWMU 38 concrete decontamination pad is coated with a sealant, and is approximately 104 feet (ft) long by 74 ft wide and is eight ft above grade. The sealant is currently noted to be peeling. The pad is sloped to direct decontamination wastes towards collection troughs that run along the south side of the decontamination pad. During decontamination operations, canvas curtains are used to enclose the pad and reduce overspray.

Approximately 250 ft south of the decontamination pad there is a ditch, trending east-west, that is approximately 350 ft long. The ditch appeared to have been excavated by scrapers and may be the borrow source used to construct the decontamination pad.

2.2 PAST OPERATIONS

Based on DPG records, open air testing of chemical agents was not conducted at DPG after 1968. Since the pad was constructed in 1986, it is highly unlikely that chemical agents or decontaminated chemical agents were ever used, stored, or spilled at HWMU 38. Decontamination solutions used were Decontamination Solution 2 (DS2), Super Tropical Bleach (STB), and Improved Chemical Biological Agent Decontaminant (ICBAD), also known as C-8.

The DS2 solution consisted of diethylene triamine (70 percent), sodium hydroxide (two percent), and ethylene glycol monomethyl ether (28 percent). The ICBAD solution consisted of one percent emulsifier (isopropanol, calcium dodecyl benzene sulfonate, polyethyl-enated tetradecyl alcohol, and water); calcium hypochlorate (eight percent); tetrachloroethene (PCE) (15 percent); and water (76 percent). Its use as a decontamination solution is the most likely explanation for the presence of PCE in the soil gas and soil. The unit was also used to clean or rinse drums used to store hazardous wastes, although hazardous solutions are no longer used at HWMU 38.

Decontamination operations have been modified several times since beginning operations. Previous investigation reports indicate that liquids from the collection troughs off of the decontamination pad were directed to a nearby buried metal tank or cistern, which probably functioned as a secondary settling basin or as a holding tank. The cistern was connected by aboveground pipes to a pumphouse and eventually into a steel 8,000 gallon aboveground storage tank, within a steel containment structure labeled “caustic soda.”

The area immediately south of the concrete pad and pumphouse is a shallow depression probably used as a collection or drainage area for runoff from the pad.

During a September 1994 site visit, it was reported that some system components had changed from previous observations. Two fire hydrants had been installed along the northern portion of the decontamination pad to provide water for the decontamination pad. Piping between the aboveground storage tank and the pumphouse had been removed. The aboveground tank had been moved closer to the pumphouse.

2.3 PREVIOUS INVESTIGATIONS DOCUMENTATION

The detailed results of previous material, soil, and groundwater sampling, and closure information including the risk assessment are available, for HWMU 38, in the DSHW public documents listed below in Table 2 (UAC R315-3.2.5(b)(13)).

Table 2: DSHW Library Documents Detailing HWMU 38 Investigations

Document Title	Received Date	DSHW Library No.
FWEC, 1996. <i>Dugway Proving Ground Closure Plan, Module 3, HWMU 38 Draft</i> . September.	09/27/1996	DPG00029
IT, 2000. <i>Field Work Variance No. 870502-04-002 including Technical Memorandum For Groundwater Investigation of HWMU 38</i> . December.	1/11/2001	DPG00200
IT, 2001. <i>HWMU 38 Final Work Plan & Sampling and Analysis Plan</i> . October.	9/07/2001	DPG00237
Shaw Environmental, Incorporated. (Shaw), 2004a. <i>Final Closure Report For HWMU 38 The Ditto Decontamination Pad</i> . March.	3/22/2004	DPG00403
Parsons Environmental Science, Inc. (Parsons), 2004. <i>Final Hydrogeological Assessment and Regional Groundwater Monitoring Plan, Volume I, Ditto GMA</i> . Dugway Proving Ground, Utah. October.	11/16/2004	DPG00459

2.4 CLOSURE ACTIVITIES

Dugway has completed closure actions for HWMU 38, and the site meets the risk-based closure criteria for future commercial/industrial site use, as specified in UAC R315-101. The remedial activities performed at HWMU 38 are described in detail in the Final Closure Report (Shaw, 2004a). The remedial investigation completed at HWMU 38 included soil and groundwater sampling. Samples were collected from 18 soil borings, 20 cone penetrometer testing (CPT)/direct push groundwater sampling locations, and five monitoring well locations. Based on the soil and groundwater samples collected, no waste is present at HWMU 38. The sample results were evaluated in the human health and ecological risk assessments as discussed below.

A number of structures and debris have been removed and disposed of from HWMU 38. All structures were disposed as non-hazardous waste or recycled as applicable. The debris previously present at HWMU 38 were of construction in nature (plastic pipes, pumps, metal pans, and cisterns, etc.) and/or regular trash (candy wrappers, drink cups, etc.). This debris was disposed of at the DPG Landfill.

2.5 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

Human health and ecological risk assessments were conducted and indicated that the remaining residual contamination at HWMU 38 does not pose an unacceptable risk as defined in UAC R315-101. The

industrial cancer risk is less than 1E-04 and the Hazard Index is less than one. Ecological risks are expected to be minimal. Since no waste is present at HWMU 38, there is not any potential for escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, surface waters, or to the atmosphere. The existing structures will continue to be used for Army testing exercises under a separate permit.

The human and ecological risk assessments are presented in the Final Closure Report (Shaw, 2004a).

2.6 SURFACE WATER AND GROUNDWATER

There are no surface-water features in the vicinity of HWMU 38, but general surface water drainage is predominately away from the decontamination pad to the south and west (Ebasco, 1993). General surface-water flow in the Ditto Area is to the northwest. The surface soil in two areas, one of which is approximately 120 ft north of the decontamination pad at the water supply station and one of which is to the south near the aboveground storage tank, is frequently wet. This moisture may be the result of ponded runoff water or precipitation. In general, this water would only infiltrate the first few inches of the soil because most of the water would evaporate before it could recharge the groundwater.

Groundwater monitoring wells are currently present at HWMU 38. A tetrachloroethene (PCE) plume is present in the water table at HWMU 38. The plume extends from the south portion of the decontamination pad, where it is present in concentrations that exceed 7,000 micrograms per liter ($\mu\text{g/L}$), to approximately 650 ft to the southwest, where it becomes non-detect. Groundwater monitoring is addressed under the Ditto GMA.

2.7 CLOSURE NOTIFICATIONS

The Certification of Closure (Appendix A) was received and verified by the Executive Secretary of the Utah Solid and Hazardous Waste Control Board on November 5, 2004.

Federal facilities are exempt from submitting notifications to the local zoning authority as required by 40 CFR §§264.116 and 264.119, which are incorporated by reference in UAC R315-8-7.

3.0 SECURITY REQUIREMENTS

HWMU 38 is located within a federal, military installation (Dugway Proving Ground). As such, the installation is restricted for the common population. Access to HWMU 38 is strictly monitored by Dugway Base Security (Range Control).

4.0 PREPAREDNESS AND PREVENTION MEASURES

All wastes have been removed from HWMU 38. The Dugway Emergency Response and Contingency Plan (Part B Permit), where applicable to this site (Module VII.M.), shall be used to announce and respond to emergency conditions. At a minimum, the site inspector should have a radio or phone and a First Aid kit available during inspections.

5.0 SEISMIC STANDARD

HWMU 38 is not located within 200 ft of any active faults. Although Utah is tectonically active, most of the earthquake activity occurs about 55 miles to the east along the Wasatch Range Foothills.

A geologic map completed in a 1988 study by the U.S Geological Survey (Barnhard and Dodge, 1988), was used to determine the distribution, relative age, and amount and extent of surface rupture on Quaternary fault scarps, in the area of HWMU 38.

The USGS study (Barnhard and Dodge, 1988) concluded that morphologic and geologic data collected along the fault scarps in the area indicate that all were formed during the later Pleistocene era and there is not any clear evidence of Holocene surface rupture. Several faults inferred on geophysical evidence are located at Dugway; however, there is no evidence of displacement during Holocene time.

6.0 FLOODPLAIN STANDARD

HWMU 38 is not located within a 100-year verified floodplain. The National Flood Insurance Rate Map, identifying the boundary of the 100-year flood, does not include Dugway. There are no permanent streams or other surface water bodies on Dugway.

Surface water from precipitation flows through well-established drainage channels into the flat plain and evaporates. Like other arid regions, Dugway is subject to flash flooding following high-precipitation events. Flash floods have occurred only four times in the history of the installation, in 1944, 1952, 1973, and 1983. The major area affected during flash floods has been the Government Creek drainage channel, which has overflowed and caused minor inundation of roads at the Ditto Technical Center.

7.0 POST-CLOSURE OPERATIONS AND INSPECTIONS

7.1 INTRODUCTION

HWMU 38 has been closed under a continued industrial use scenario, which prohibits residential use in the areas formerly occupied by the site. To ensure that the area is not reused or developed for residential purposes, annual site inspections and a biennial report shall be required. HWMU 38 will continue to be used for Army testing exercises. Army activities at the decontamination pad will be managed so that they do not contribute to soil or groundwater contamination.

7.2 GROUNDWATER MONITORING

Post-Closure management of the HWMU 38 groundwater monitoring shall be in accordance with the Ditto Groundwater Management Area (GMA) Plan (PES, 2004) and condition VII.Q.

7.3 ANNUAL INSPECTIONS

General site inspections of the former HWMU 38 site shall be conducted annually before November 1st, to ensure that the former site remains under industrial use and to verify the Dugway Dig Permit process as described in Module VII.I has been followed.

The general post-closure site inspection checklist for industrial use sites as provided in Module VII, Form A, should be used. Completed inspection forms shall be filed with the Dugway Environmental Office.

The site shall be visually inspected to ensure the following conditions are maintained at the site:

1. There is no evidence of land use other than for industrial purposes within the former site boundary;
and
2. Inspect for evidence of soil disturbance.

Table 3 summarizes the Post-Closure Inspection Schedule for HWMU 38, and lists the items to be inspected and potential problems. Inspection personnel shall note any problems found and shall inform appropriate Dugway representatives.

Table 3: HWMU 38 Post-Closure Inspection Schedule

Inspection/Monitoring Item	Method of Documentation	Frequency of Inspection
Land Use	General Post-Closure Site Inspection Checklist (Form A, Module VII)	Annual Inspection conducted before November 1 st

7.4 INSPECTION FOLLOW-UP

Copies of completed general post-closure site inspection checklists for industrial use sites (Module VII, Form A) shall be forwarded to the Dugway Environmental Office. The Point-of-Contact for the Dugway Environmental Office is as follows:

Environmental Programs Compliance Representative
Dugway Proving Ground Environmental Program Office
Dugway Proving Ground, UT 84022
Telephone: (435) 831-3560

The Dugway Environmental Office shall notify the appropriate personnel to implement corrective action as needed. Corrective action shall be initiated as soon as practical after identifying the problem. If the corrective action requires substantial effort, a technical plan shall be prepared to summarize the problem, the potential impacts, the proposed plan for action, and the time frame in which corrective action shall be implemented as required under this Permit. This plan shall be approved by the Executive Secretary and shall be submitted within 30 days of Dugway's decision to implement corrective action.

8.0 SUBMITTALS/REPORTING

Based on the evaluation presented in the Final Closure Report for HWMU 38, post-closure monitoring, including groundwater monitoring under the guidance of the Ditto Groundwater Management Plan (PES, 2003), is required for HWMU 38. Groundwater results will be reported through the requirements of the Ditto Groundwater Management Plan, not within the biennial report for HWMU 38

8.1 NON-COMPLIANCE REPORTING

The conditions at HWMU 38 are such that the impact to human health and the environment is very unlikely. No wastes remain at the site. Hazardous wastes are no longer managed or maintained at the site. Army activities at the decontamination pad will be managed under a separate permit. Nonetheless,

if there is any type of non-compliance with any condition of this Permit, notifications shall be submitted per Permit Conditions VII.C.5.

8.2 BIENNIAL POST-CLOSURE REPORT

In accordance with UAC R315-3-3.1(1)(9), a Biennial Post-Closure Report shall be prepared for all Dugway closed HWMUs and SWMUs undergoing post-closure care. Post Closure Reports shall be submitted to DSHW no later than March 1st, of the following year that the report is due. The first Post-Closure reporting year is 2007 for HWMU 38. The report shall be submitted no later than March 1st of 2008. Specifically for HWMU 38, the Biennial Post-Closure Report shall include, at a minimum, the following:

- General site description and conditions
- Inspection records.

8.3 REQUIRED SUBMITTALS

Table 4 summarizes the requirements for the Biennial Post-Closure Report for HWMU 38 and reporting for any non-compliance.

Table 4: Summary Table of Required Submittals

Required Submittals	Frequency and Submittal Date
<u>Biennial Post-Closure Report</u>	Post-Closure Reports shall be submitted to the DSHW no later than March 1 st , of the following year that the report is due. Reporting years are odd numbered years beginning with March 1, 2007, for the duration of the Post-Closure Monitoring Period.

<u>Non-Compliance Reporting</u>	
<ol style="list-style-type: none"> 1. Anticipated Non-Compliance. 2. 24-hour Notification for information concerning the non-compliance, which may endanger public drinking water supplies or human health or the environment (Module VII.C.5.). 3. Five-day written notification for information concerning the non-compliance, which may endanger public drinking water supplies or human health or the environment. The Executive Secretary may waive the 5-day notice, in favor of a 15-day notice (Module VII.C.5.). 4. Written notification for information concerning the non-compliance, which does not endanger human health or the environment (Module VII.C.5.). 	<ol style="list-style-type: none"> 1. 30 days advance notice of any change which may result in noncompliance. 2. Orally within 24 hours of discovery. 3. Within 5 days of discovery. 4. Submitted with the Biennial Post Closure Report are submitted.

9.0 POST-CLOSURE CERTIFICATION

No later than 60 days after post-closure activities are completed and approved by the Executive Secretary, Dugway representatives shall submit a certification to the Board, signed by Dugway and an independent professional engineer registered in the State of Utah, stating why post-closure care is no longer needed.

10.0 REFERENCES

Barnhard, T.P. and R.L. Dodge, 1988. *Map of Fault Scarps Formed on Unconsolidated Sediments, Tooele 1° x 2° quadrangle, Northwestern Utah*, United States Geological Survey.

Ebasco, 1993. *Final Nature and Extent Investigation Plan No. 1 – SWMU 38*. March.

Parsons Environmental Science, Inc. (Parsons), 2003. *Groundwater Monitoring Assessment, Ditto Area*.

Shaw Environmental, Inc. (Shaw) 2004a. *Final Closure Report, for HWMU 38, The Ditto Decontamination Pad, Dugway Proving Ground, Utah*. March.

Shaw, 2004b. *Field Work Variance No. 870502-26-003 - HWMU 38 Debris and Structure Removal and Disposal*. March.

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MODULE VII

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APPENDIX A

HWMU 38

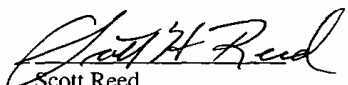
CERTIFICATE OF CLOSURE

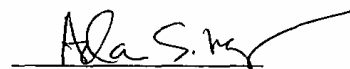
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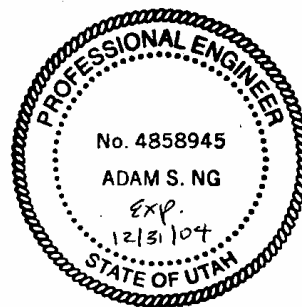
The Closure Report for Hazardous Waste Management Unit (HWMU) 38 at Dugway Proving Ground, Utah has been prepared by Shaw Environmental in accordance with the closure requirements specified under the Utah Administrative Code (UAC) 315-7-14 and 40 Code of Federal Regulations 265, Subpart G. The requirements of UAC 315-101 form the basis for the risk-based criteria in the closure of HWMU 38.

In accordance with 40 CFR 265.115, the signature and seal certify that a licensed professional has reviewed the Closure Report in accordance with the above referenced regulatory requirements.

Respectfully submitted,


Scott Reed
Directorate of Environmental Programs
Dugway Proving Ground


Adam S. Ng, Ph.D., P.E.
Utah Registered Civil Engineer No. 4858945-2202
Shaw Environmental, Inc.



DUGWAY PERMIT

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HWMU 38

FIGURES